IMMERSED ELECTRODES HUMIDIFIERS
EASY**STEAM**
ES3-M-OEM

Use and Maintenance Manual

READ AND KEEP

Tecnomac®

Thank you for choosing a sunk-electrode EASYSTEAM humidifier

Read this manual carefully: doing so will ensure that installation is carried out correctly and that the machine is used properly and efficiently.
You are therefore advised to store the manual near the humidifier so that it can be consulted for maintenance and/or modification purposes as and when necessary..

To aid comprehension the manual contains the following symbols:

Note to be read carefully.

Indicates procedures that must be followed with due care and attention so as to prevent damage to the humidifier, injury or malfunctions

Indicates forbidden practices and procedures which could cause damage to the humidifier, injury or malfunctions.

Useful tip.

Indicates that the customer service centre should be contacted.

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1.1 GENERAL

EASYSTEAM sunk-electrode humidifiers are the latest family of humidifiers to be released onto the market: they are characterised by outstanding completeness of performance and extremely simple maintenance

EASYSTEAM humidifiers feature software with an extensive programming range, full personalisation and completely automatic operation

This means that the user can set steam output to maximum or some intermediate percentage, regulate de-concentration emptying frequency or have all the water emptied automatically when the machine has been idle for a set time.

The EASYSTEAM line also features a display that shows real-time room humidity, the current being absorbed by the electrodes, working hours, various warnings/alarms, water filling/emptying status and a full range of user-friendly programming parameters.

EASYSTEAM humidifiers also incorporate a buzzer to warn the user of any faults; the internal software evaluates the seriousness of the problems and shuts down or continues steam generation accordingly.

A key advantage of the EASYSTEAM range is that the cylinder with the stainless steel electrodes is easily changed when normal wear makes such replacement necessary.

1.2	OPERATING PRINCIPLE

The sunk-electrode humidifiers in the EASYSTEAM range use the conductivity of potable water to produce steam by boiling.

The cylinder electrodes are sunk in the water: a current is generated between the electrodes and this heats the water to boiling point.

Current intensity (expressed in amperes) varies according to the quantity of in-cylinder water that is in contact with the electrode surfaces and the conductivity of the water.
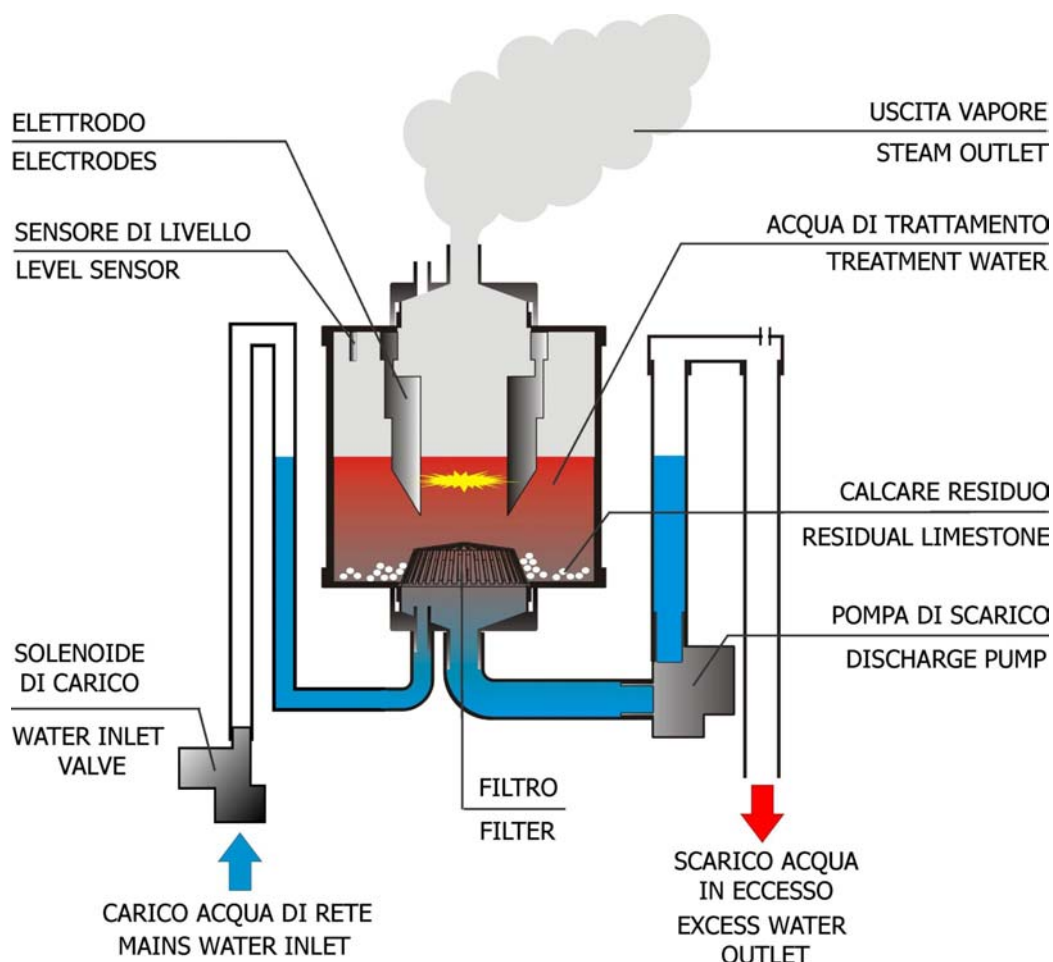
The electronic controller measures, via an amperometric transformer, current intensity and controls the water inlet valve (to raise the water level) or the discharge valve (to lower it) accordingly. This system is fully automatic.

Combined use of the microprocessor and a humidity sensor also makes it possible to effect proportional control: this optimises water and electricity consumption according to required humidity levels.

In addition to ensuring that the humidifier works properly the discharge pump also empties the cylinder completely when the unit had been idle for a set time: this prevents lime scale or other particles created during the boiling process from depositing.

The humidifiers in the EASYSTEAM range are fully automatic and require only replacement of the cylinder when the electrodes are worn.

The diagram below illustrates the operating cycle.

ELETTRODO / ELECTRODES

SENSORE DI LIVELLO / LEVEL SENSOR

SOLENOIDE DI CARICO / WATER INLET VALVE

FILTRO / FILTER

CARICO ACQUA DI RETE / MAINS WATER INLET

USCITA VAPORE / STEAM OUTLET

ACQUA DI TRATTAMENTO / TREATMENT WATER

CALCARE RESIDUO / RESIDUAL LIMESTONE

POMPA DI SCARICO / DISCHARGE PUMP

SCARICO ACQUA IN ECCESSO / EXCESS WATER OUTLET

The supplied steam is managed proportionally to steam production request that the electronic control computes on the basis of functioning selected between the available five described at chap.2.2. The minimum steam supply is fixed at 20% and it is managed by an activation hysteresis; the maximum supply obtained with the maximum steam production request, corresponds to first level variable set percentage (Pr). For example if the steam production percentage Pr, on ES3 humidifier that produces 3Kg/h of steam, is set to 100%, the maximum supply will be 3Kg/h; but if Pr=50 the maximum supply will be 1,5Kg/h
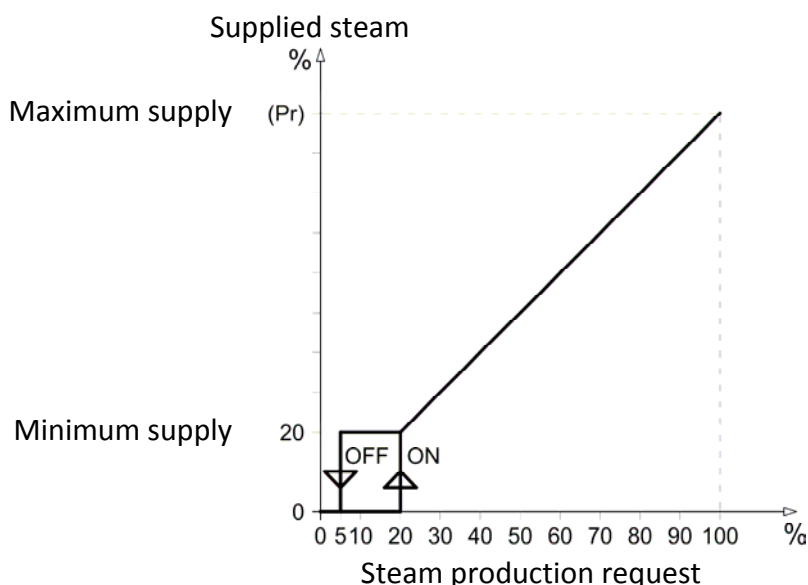
To ensure proper humidifier performance use only mains drinking water; this is because it is free from any harmful content and is compatible with the conductivity range needed for optimal humidifier performance. Note that in some areas mains water may be unsuitable for optimal performance owing to very low conductivity or very hard or too much aggressive; the following table summarizes the parameters required for correct humidifier operation..

WATER SUPPLY OPERATING RANGE		LIMITS	
PARAMETER	UNIT OF MEASURE	MIN	MAX
* Conductivity of water at 20° C	μS/cm	250	1300
Hardness	mg/l $CaCO_3$	160	450
Chlorine	mg/l Cl	0	0,2
Chlorides	ppm Cl	0	25
Calcium sulphate	mg/l $CaSO_4$	0	95
Metalline impurities / Solvents / Soaps / Lubricants	mg/l	0	0
Temperature	°C	+1	+40

* Stated conductivity refers to water at 20° C; bear in mind that conductivity diminishes as water temperature falls and so water may not be very conductive in winter when mains water is particularly cold.

To avoid this inconvenience, diminish the produced steam percentage described in chapter 3 PROGRAMMING of this manual.

Do not fill the humidifier with water from wells or water that has been treated with softening purifiers.

1.3	OEM SERIES HUMIDIFIER ID CODES

ES3-M-OEM   single-phase custom humidifier complete with electronic kit with steam output capacity of 3 Kg/h, proportional operation with 0-10 V signal.

1.4	OEM SERIES HUMIDIFIERS TECHNICAL DATA

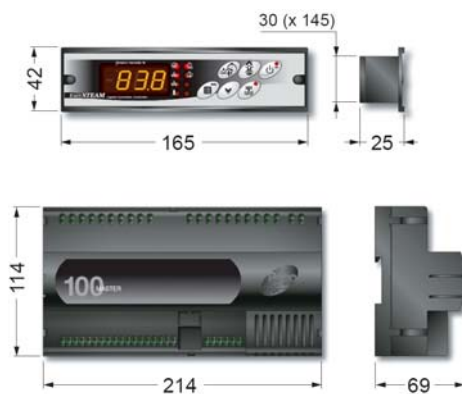| TECHNICAL DATA and OPERATING CONDITIONS	ES3-M-OEM
STEAM PRODUCTION (Kg/h)	3
ELECTRICAL POWER SUPPLY	230V 50-60HZ
POWER (KW)	2
ABSORBED CURRENT (A)	9
TYPE OF CONTROL	SLIM EASYSTEAM
ELECTRONIC CONTROL POWER SUPPLY	230V 50-60HZ
STEAM OUTLET DIAMETER (mm)	25
NUMBER OF CYLINDERS	1
WEIGHT (EMPTY) (Kg)	6
WEIGHT OF WORKING UNIT (Kg)	8
WATER SUPPLY PRESSURE	1-10 bar
WORKING AMBIENT TEMPERATURE	+1 ÷ +50 °C
WORKING AMBIENT HUMIDITY	< 60 %RH (90 %RH non condensing)
STORAGE TEMPERATURE	-10 ÷ +70 °C
PROTECTION RATING	IP00
AMBIENT TEMPERATURE OF ELECTRONIC CONTROL OPERATION	+0 ÷ +60 °C
AMBIENT HUMIDITY OF ELECTRONIC CONTROL OPERATION	< 60 %RH (90 %RH non condensing)
ELECTRONIC CONTROL PROTECTION RATING	IP20

1.5	OVERALL DIMENSIONS

OEM SERIES
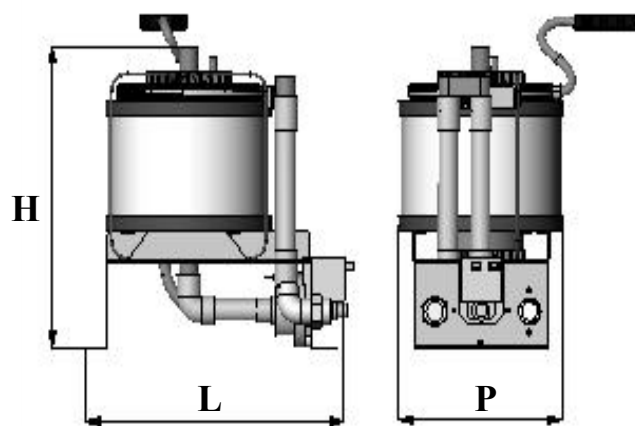
STEAM GENERATING UNIT   ELECTRONIC KIT

TYPE	ES3-M OEM
L	340
P	210
H	380

Measurements in mm.

1.6	IDENTIFICATION DATA

The unit described in this manual has, on its side, an ID plate showing all the relevant identification data:

• Name of Manufacturer
• Unit model
• Serial number
• Power supply voltage
• Rated current

CAP. 2 PROGRAMMAZIONE

2.1 DESCRIPTION OF SLIM CONTROLLER

1. The SLIM CONTROLLER is the control unit on the front of the humidifier. It consists of an 8-LED display to visually check values (fig. 25) and 6 keys to adjust display and modify settings (fig. 26).
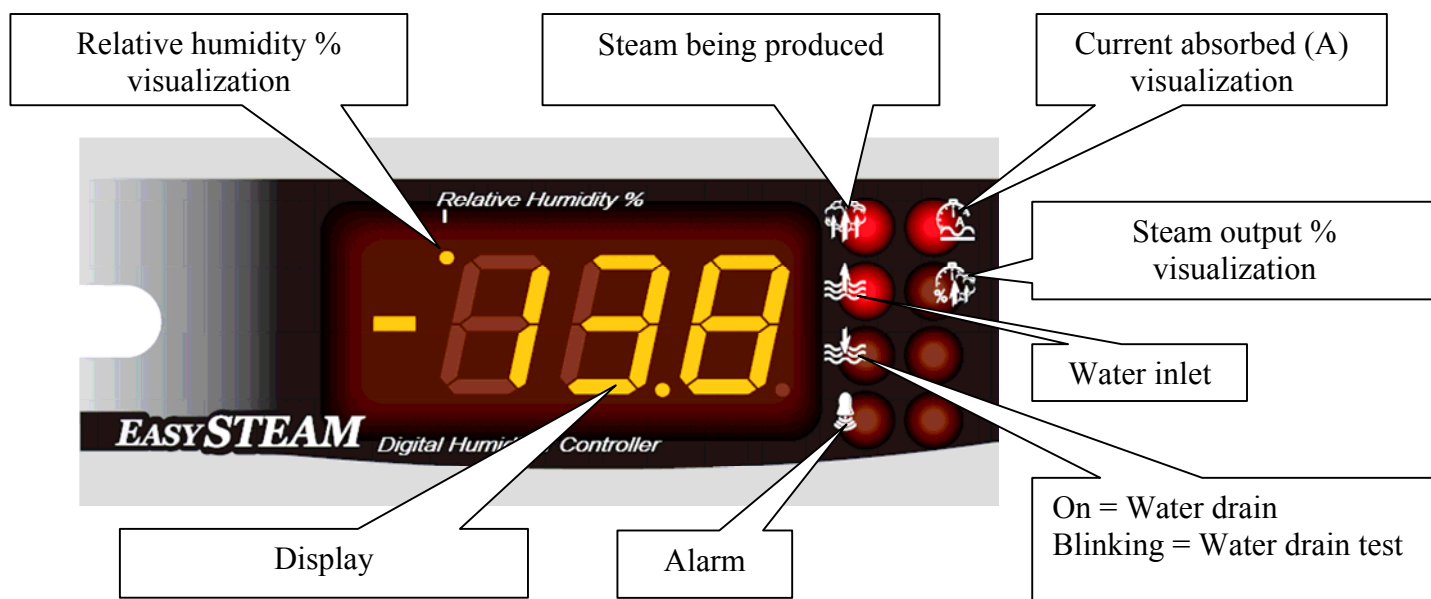
Relative humidity % visualization

Steam being produced

Current absorbed (A) visualization

Steam output % visualization

Water inlet

Display

Alarm

On = Water drain
Blinking = Water drain test

Fig. 25

Used to display absorbed current or steam production (%)

UP key, alarm mute

ON/OFF Stand-by key

SET key

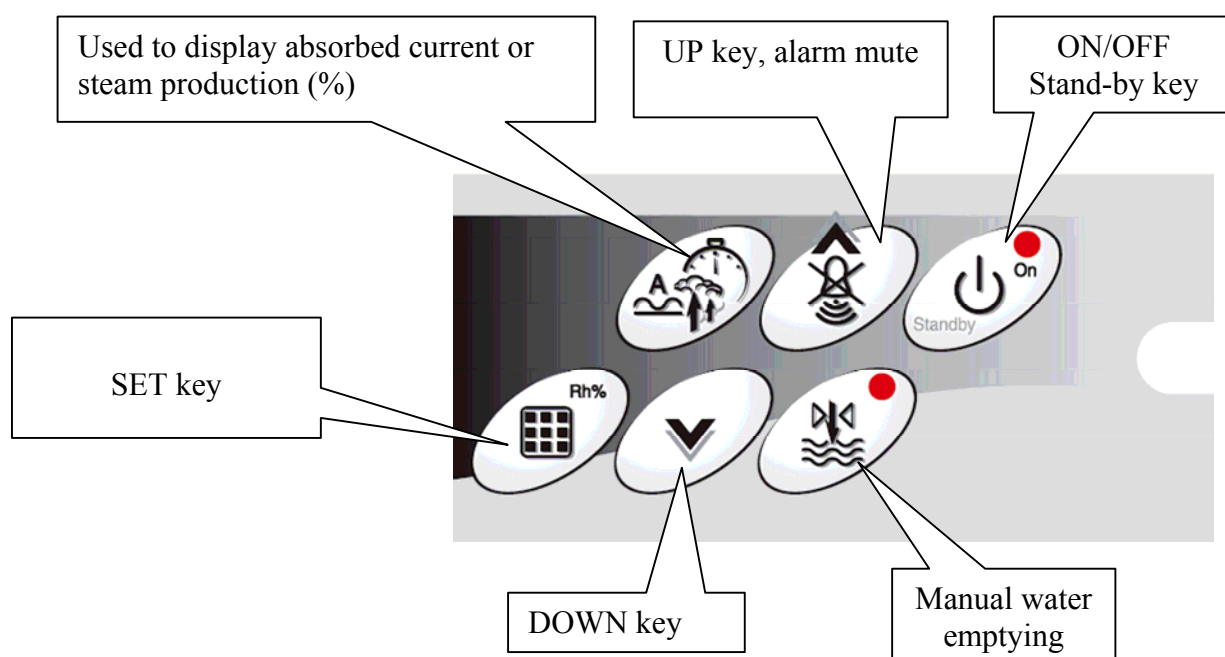DOWN key

Manual water emptying

Fig. 26

2.2 LEVEL 1 PROGRAMMING

1. Level 1 programming allows the user to modify the steam production percentage Pr.

VAR.	MEANING	VALUES	DEFAULT all models
Pr	**Steam production percentage**	20 ÷ 100 %	70 %
Bp	**Not used**		
StC	**Not used**		
r0	**Not used**		
UrC	**Not used**		

The steam percentage value Pr is the value the humidifier is able to reach at maximum output. For example, leaving the setting at 100% on an ES3 rated at 3 Kg/h will give 3 Kg/h of steam output; if the Pr setting is reduced to 50% the humidifier will produce 1,5 Kg/h at most.

The **Pr** variable is highly useful where water conductivity is poor and when you need to make the most of the cylinder when it is nearing replacement; for further information consult chapter 5 TROUBLESHOOTING of this manual.

To gain access to the Level 1 programming menu proceed as follows:
- Press the (▲) and (▼) keys simultaneously and keep them pressed for a few seconds until the first programming variable appears on the display.
- Release the (▲) and (▼) keys.
- Select the variable to be modified using the (▲) or (▼) key.
- When the variable has been selected it is possible:
- to display the setting by pressing SET
- to modify the setting by pressing the SET key and the(▲) or (▼) keys.
- When configuration values have been set you can exit the menu by pressing the (▲) and (▼) keys simultaneously for a few seconds until the parameter shown before programming was accessed (e.g. steam production or absorbed current) reappears.
-       The new settings are saved automatically when you exit the configuration menu.
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CAP. 3 SWITCHING ON THE HUMIDIFIER

3.1	INITIAL START-UP

1. Check that default setting is compatible with signal connection.

   1. Before powering up the humidifier check for correct connection of phases and signal type; check for correct connection of the water mains, excess water discharge and steam pipes.

   If the mains water feed line consists of piping that might contain oily residues or other foam-generating substances it is essential that it be washed out by letting water flow through for several minutes.

2. To verify the absence of water loss internally the humidifier

3. Power up the humidifier.

4. The humidifier will carry out a water discharge for several seconds as it emits a prolonged beep.

5. At this point the humidifier is in STAND-BY mode; to switch it on press the ON/OFF – STAND-BY key: current absorption is displayed.

6. To function correctly humidifier needs enabling at digital input 1 with a free-voltage contact (terminal blocks 1 and 2 on 100 Master card) indifferently from selected functioning mode.
   If enabling is missing, the display will show OFF alternate to normal visualization.

3.2	STEAM PRODUCTION

1. Set the enable.

2. Let the cylinder fill until the water starts to boil; empty the cylinder completely using the MANUAL DISCHARGE key to prime the pump and repeat the procedure once or twice.

3. At this point the humidifier is operative and will work autonomously

CAP. 4 MAINTENANCE

| 4.1 | MAINTENANCE |

To ensure working safety, correct functioning and an optimal output of EASYSTEAM humidifiers, it is necessary to execute maintenance operations according to following instructions.

| 4.2 | GENERAL SAFETY RULES |

Every type of maintenance has to be done exclusively by experienced and qualified technical staff, conscious about necessary safety.

Before starting any maintenance procedure, to proceed as follows:
1. If unit is out of service because of an alarm condition, to note the displayed error code.
2. To close the valve of water supply.
3. To put the humidifier in stand-by using the proper key and discharge completely the water contained in the cylinder using the key "Manual water emptying" on Slim Controller (see chap. 3).
4. To disconnect the unit from the electric system sectioning the power input permanently padlocking it on OFF.
5. To wait the cylinder and the humidifier have cooled or to use protection gloves.
6. Each unit element, if it is defective, has to be replaced exclusively with original spare parts.

| 4.3 | MAINTENANCE INTERVALS |

Following are indicated the maintenance operations to execute and their suggested frequency.
Being electrodes consumption and incrustations and solid deposits formation into the cylinder variables according to the type of water (also with the same conductivity), it could be necessary to modify these intervals.
To verify this need checking the deposits quantity into the cylinder; a quickly accumulation of incrustations and deposits requires to increase the suggested maintenance frequency and/or the de-concentration discharges parameters variation.

To minimize residual formation on the bottom of cylinder it's advisable to increase deconcentration drain frequency reducing value of **S2** parameter. This trick has disadvantage of bigger water and energy consumption.

MAINTENANCE INTERVENTION	FREQUENCY
To verify there are not water losses internally the humidifier.	after 1 hour of working
To verify electrical connections clamping.	after 4 weeks of working
To verify there are not water losses internally the humidifier. To verify the cylinder state, to remove incrustations and deposits if present. To replace the cylinder if necessary.	monthly or every 500 hours of working
To verify cylinder electrodes consumption and the absence of deformations or darkening on their surface; to replace the cylinder if worn and torn and if it shows manifest faults.	quarterly or every 1000 hours of working
To replace the cylinder. To verify electrical connections clamping and water and steam connections good state.	yearly or every 2500 hours of working
To verify there are not water losses internally the humidifier. To verify cylinder state, to verify electrodes consumption, to remove incrustations and deposits if present and to replace the cylinder if necessary.	with alarm code E1
To verify there are not water losses internally the humidifier. To verify that the solenoid valve is not disconnected or broken and to replace it if necessary.	with alarm code E3
To verify that the drain pump is not disconnected or broken and to replace it if necessary. If present to remove incidental obstructions on cylinder bottom and/or in draining pipes.	with alarm code E5 or E6

4.4   CHANGING THE CYLINDER

The only part of the humidifier subject to wear is the electrode cylinder. This wears according to how much the machine is used or it is not possible to remove the internal incrustations.

The EASYSTEAM range features stainless steel electrodes to maximise durability: however, durability will largely depend on the quality of the water (conductivity and hardness) and on how much the machine is used.

When the electrodes are worn the water level will rise excessively and trip the maximum level alarm **E1** several times: the cylinder must, at this point, be replaced.

Once you have checked that this alarm does not have other causes (see Chap. 6 – Troubleshooting) change the cylinder. Proceed as follows:

NEVER CHANGE THE CYLINDER WITH THE MACHINE HOT AND WITH WATER INSIDE IT. EMPTY ALL THE WATER FROM THE CYLINDER USING THE MANUAL DISCHARGE KEY FIRST! IT IS COMPULSORY TO FOLLOW THE INSTRUCTIONS REPORTED AT CHAPTER 6.2.

1. Insert the new cylinder by repeating the above procedure in reverse order; check that the new cartridge has the 2 supplied O-rings and that they are positioned correctly. If necessary to use on O-rings and flanges the lubricating issued with the humidifier for making their insertion easier (fig. 35 and 36).

Fig. 35

Fig. 36

2. Flush the cylinder completely 2 – 3 times immediately after replacement: do this by pressing the "manual empty" key

3. To verify there are not water losses internally the humidifier after 1 hour of working from cylinder replacing.

If there is a power supply failure during cylinder replacement empty the cylinder by detaching the filling hose from the relevant solenoid valve (fig. 37).
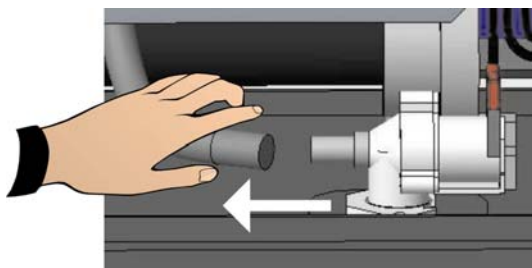

Fig. 37

4.5	CLEANING THR CYLINDER

When presence of incrustations and deposits into the cylinder prevents an adequate passage of current between electrodes or thwarts the water discharge, it is necessary a cleaning operation of cylinder.

NEVER CHANGE THE CYLINDER WITH THE MACHINE HOT AND WITH WATER INSIDE IT. EMPTY ALL THE WATER FROM THE CYLINDER USING THE MANUAL DISCHARGE KEY FIRST! IT IS COMPULSORY TO FOLLOW THE INSTRUCTIONS REPORTED AT CHAPTER 6.2

1. Remove the cylinder from humidifier
2. Utilizing the hole on upper side of cylinder, to clean and remove the incrustations on the electrodes and on accessible parts with a mechanical action using a plastic spatula and running water or with a solution of water and 20% acetic acid (fig. 38). Execute the same operation on slits of lower filter (fig. 39). During clearing operations do not damage or scrape coupling parts that assure hydraulic seal as O-ring housing or flanges' entrance. During clearing operations do not wet the connector or cables holder ring UM-CA-01 (fig. 40).

Fig. 38	Fig. 39	Fig. 40

3. Clean and control the two O-ring integrity, replace them if necessary and verify their correct positioning in the two predisposed housings on cylinder. Insert the cylinder by repeating the above procedure in reverse order and verify its correct positioning. In coupling use the lubricating issued with the humidifier for making readjustment operations easier.

4. Flush the cylinder completely 2 – 3 times immediately after replacement: do this by pressing the "manual empty" key.

5. To verify there are not water losses internally the humidifier after 1 hour of working from cylinder replacing.

5.1   **OEM SERIES EXPLODED VIEW**
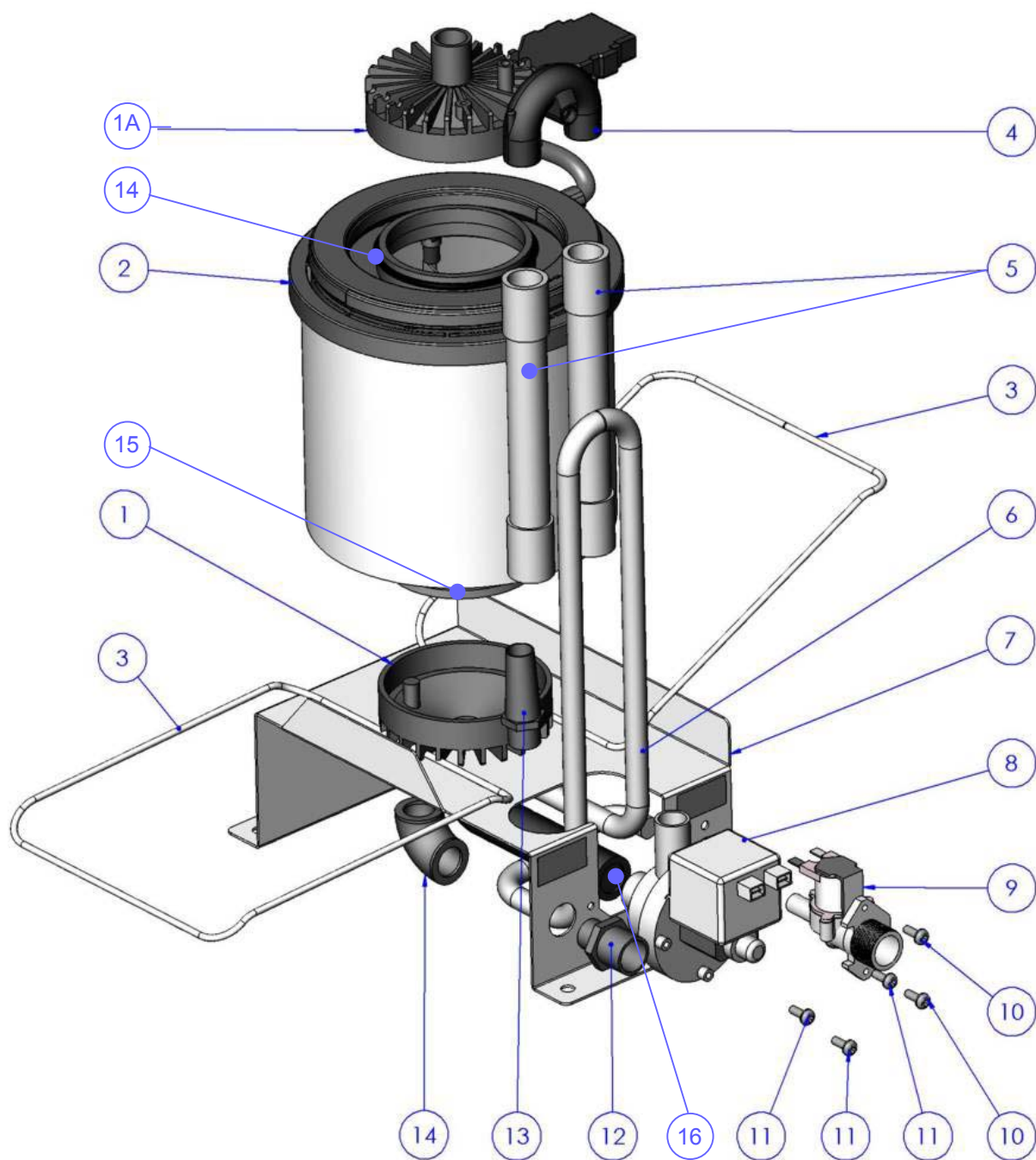
OEM SERIES SPARE PARTS LIST		
Rif	**Code**	**Description**
1	UMICO25	DN25 steam output flange
1A	UMICO25	DN25 steam output flange
2	400UMCL04	Electrodes cylinder for ES3-M-OEM
3	UMIMOLLA4	Cylinder fixing spring for ES3-M-OEM
4	UMISIFONE1	Water drain siphon (exceeding water or deconcentration drain)
4+5	400UMSIF04	Complete siphon kit + water drain pipes for ES3-M-OEM
6	UMITUBO10-2	Tap water inlet pipe (L=1250mm)
7	UMILAMCUST	aisi 316 stainless steel sheet panel bracket
8	400UM931OEM	230V 50/60 Hz asyncronous drain pump
9	UMIVALV1	230V 50/60 Hz solenoid valve for water filling
10	-	Solenoid fixing screws
11	-	Pump fixing screws
12	UMIMAN12	DN25 hose for water drain
13	UMIGOM12	½ gas elbow
14	UMIPORTGOM12	½ gas hose bracket
15	UMIOR1	O-Ring diameter 88,49 X 3,53 SILICON 60Sh.
16	UMICURVA90°	24mm joint elbow 90°

Request spare parts from your dealer.